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ABSTRACT

This paper presents the outcomes of a study that investigated the psychometric properties of the School Independence Measure (SIM), an assessment designed to evaluate functional performance in a school setting and to monitor changes in function over time. The SIM operationally defines and criterion references tasks essential to a child's independence at school in order to facilitate an interventions framework for setting attainable goals and for monitoring progress. The SIM builds upon the conceptual and organizational format of the WeeFIM: Functional Independence Measure for Children. The study examined the SIM and standard batteries of cognitive and behavior to establish the relationship between those processes and SIM scores. The community sample was comprised of 32 9- and 10-year old forth grade boys and girls with attention deficit hyperactivity disorder. Psychoeducational assessment data, including cognitive test scores (Wechsler Intelligence Scale for Children-III) and behavioral ratings (Conners' Parent and Teacher Rating Scales-Revised) were recorded for validity studies. Subsequently, each participating child's teacher was contacted to complete a SIM for the referred child and simultaneously for one of the child's hypothetical typical peers. Results of the study found evidence of convergent and divergent validity for the SIM and principle components analyses support the construct validity of the SIM. (Appendices include data charts.) (CR)

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School Independence Measure:

Conceptual Framework and Use with Children with ADHD

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The work of Drs. Michael Msall and Thomas Lock in assessing functional independence in children with disabilities was the impetus for this study of functional independence at school. Appreciation is expressed for their assistance with this project.

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Abstract

Data are presented supporting the validity and reliability of a new instrument called the School Independence Measure (SIM). Experience with children exhibiting attention and learning challenges manifests the importance of a contextualized assessment framework that acknowledges behavior/setting interactions while simultaneously measuring the child's independence and special needs. The SIM operationally defines and criterion references tasks essential to a child's independence at school. This approach facilitates an intervention framework for setting attainable goals and for monitoring progress. The SIM allows professionals and families to plan educational goals across school situations so that the child can be as independent as possible.

School Independence Measure:

Conceptual Framework and Use with Children with ADHD

Objective

The objective of this pilot study was to investigate the psychometric properties of the School Independence Measure (SIM).

Rationale

One barrier to the design of research and intervention programs for optimizing functional outcomes and school participation in children with developmental problems is the lack of a measure of functional skills and challenges at key ages in educational settings. Though a variety of assessment tools for developmental surveillance is available (Sattler, 2001), these discriminative instruments, which assess a child's performance compared to a normative sample, cannot capture the impact of behavioral, social, physical, or learning problems on school functioning. To address the need for a criterion-based functional assessment instrument, the SIM was designed to evaluate functional performance in a school setting and to monitor changes in function over time, not to classify or discriminate among children. The SIM builds upon the conceptual and organizational format of the WeeFIM: Functional Independence Measure for Children (Msall, et at. 1994; 1997; 1999; 2000). This pilot study examined the SIM and standard batteries of cognition and behavior to establish the relationships between those processes and SIM scores.

There are several reasons for measuring functional performance in children with developmental problems. Classification systems, such as DSM-IV and special education eligibility criteria, have been developed to enhance the description of goals and outcomes by requiring documentation that symptoms have a substantial functional impact on a person's adaptive or educational performance. For example, in children with cognitive impairments, assessments of adaptive behavior, resources, and support are required before a child can be classified as having mental retardation. IQ tests simply are not designed to address issues concerning functional status. In schools, functional assessments can yield baseline descriptive data, assist with the selection of educational goals, and guide the evaluation of intervention efforts.

Background and Significance

The SIM is a rating scale that measures the degree of a student's functional independence in performing various academic and non-academic activities in a school setting. Behavioral, social, physical, or learning disabilities may vary in their impact across various school situations. Rather than classifying different causes or types of disabilities, the SIM addresses situational variation in a student's independence. The focus of measurement is on the degree of independent performance of tasks, not what caused the disability. All items assess behavior/school situation interactions by evaluating a student's current level of independent functioning in school situations as well as the amount of assistance a student needs beyond that provided to other students of the same age and grade.

Pragmatic issues are emphasized on the SIM: How independent is a student in performing essential school activities? The SIM is a criterion-referenced, graded-response inventory to be completed by teachers or other persons who have observed the student's typical functioning in

school. The SIM is rated from 7 (Does very well or almost always) to 1 (Does not perform the activity). The score is obtained by way of the teacher checking categories of the child's needs. The categories being rated are travel, transitions, group activities, classroom didactics, individual work, cafeteria, restrooms, recess, unexpected events, field trips/assemblies and substitute teachers. SIM scores range from 11 to 77; high scores indicate greater functional independence across settings. A copy of the SIM protocol is appended.

Method

Children referred for an evaluation of ADHD from elementary schools in the Northeast were recruited to participate in the study. The community sample was comprised of 32, 9- and 10-year old fourth grade boys and girls from diverse ethnic and socio-economic strata. With parental permission, psychoeducational assessment data, including cognitive test scores (Wechsler Intelligence Scale for Children—III) and behavioral ratings (Conners' Parent and Teacher Rating Scales---Revised), were recorded for validity studies. Subsequently, each participating child's teacher was contacted to complete a SIM for that referred child and simultaneously for one of the child's hypothetical "average" classroom peers.

Results

Validity

There were no significant gender differences in cognitive abilities as defined by IQ scores nor in parent and teacher ADHD ratings therefore, data for boys (n=21) and girls (n=11) were combined for all analyses. Convergent validity for the SIM was evidenced by strong correlations between parent ADHD ratings and SIM total scores (-.79) and for teacher ADHD ratings and total SIM scores (-.70). (Note that high scores on the ADHD scale and low scores on the SIM are clinically important). Divergent validity for the SIM was indicated by low correlations

between IQ and total SIM scores (.17). In addition, there was a statistically significant difference between the total SIM scores for the children referred for ADHD (M=60.09; SD=9.8) and their non-referred classmates (M=73.78; SD=5.1), $t(31)= -9.99$, $p< .01$.

To explore measurable constructs concerning independent functioning, responses of the teachers of 32 children with ADHD were analyzed using principal components procedures and orthogonal varimax rotations. SIM items were distributed among three factors with eigenvalues above 1.0: Classroom Routines, School Routines, and Sporadic Events. Items were assigned to factors on the basis of highest factor loadings. The three factor solution accounted for 75.6% of the total variance. Lowest independence ratings were assigned for behaviors observed during sporadically occurring events at school. Table 1 presents the factor loadings for the three factors, summary statistics, internal-consistency coefficients, and factor intercorrelations.

Cross-Validation

Table 2 contains cross-validation evidence obtained by analyzing the factor structure of the SIM for a sample of 32 non-referred children. Principal components analysis rotated to varimax solutions yielded the same three factors found in the sample of children with ADHD. In this cross-validation sample, the three factor solution accounted for 82.9% of the total variance. Again, the lowest independence scores were given for the factor describing sporadically occurring events.

Reliability

For both samples, two factors (Classroom Routines and Sporadic Events) had sufficiently high reliability coefficients to indicate adequate internal consistency (Cronbach's alpha). The third factor, School Routines, had only modest internal consistency. Factor intercorrelations suggest that the three factors are moderately independent.

Discussion

This pilot study provided evidence of convergent and divergent validity for the SIM. Principal components analyses for the two samples support the construct validity of the SIM. The same factor structure was obtained for groups of children referred for ADHD and their non-referred classmates. The three SIM factors described routine classroom and school activities as well as sporadically occurring events. Notable about the findings were that different factors accounted for most of the variance between the two groups. For the sample of children with ADHD, the factor concerning classroom routines accounted for most of the variance whereas for the non-referred children, the factor describing sporadically occurring events accounted for most of the variance. For both groups, the lowest independence ratings were assigned for behavior observed during sporadically occurring events. Unpredictable or infrequent events may be unsettling for all children because the expectations and norms for behavior are less clearly defined than during daily routines.

A limitation of the study is the small sample size that makes it difficult to draw firm conclusions about the psychometric properties of the SIM at this time. However, the results of this study are promising and suggest that the SIM is worthy of further investigation. Teachers responding to the SIM reported that the items address meaningful dimensions of school functioning. The SIM has the advantage of specifying behaviors in which children may be deficient and relating the deficiencies to functionally important outcomes in school settings. Broadening the range and type of assessment procedures used by school psychologists to incorporate information on functional independence is necessary to meet the demands for inclusive education reforms.

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Table 1
Varimax Rotated Factor Matrix Showing Factor Loadings, Reliabilities, and Summary Statistics for the School Independence Measure Used With Students Referred for ADHD

Item Topics	Factor Loadings			
	I	II	III	Total Scale
Classroom Routines				
Transitions	.88	.14	.06	
Classroom Didactics	.87	.08	.09	
Group Activities	.85	.15	-.22	
Independent Work	.73	.36	.15	
Sporadic Events				
Substitute Teachers	.12	.87	-.11	
Field Trips/Assemblies	.33	.84	.06	
Unexpected Events	.28	.59	.43	
School Routines				
Cafeteria	-.08	.15	.85	
Recess	.13	.18	.81	
Travel to School	.36	.23	.73	
Rest Rooms	.34	-.01	.68	
Eigenvalues	4.19	1.79	1.45	
Percent of Variance	38.10	23.30	14.20	75.60
Alpha Coefficients	.80	.76	.34	.78
Mean Score	20.50	16.28	23.43	60.09
Standard Deviation	4.59	3.74	3.23	9.77
Total Scale and Factor Intercorrelations				
I	---	.68	.37	.93
II		---	.68	.84
III			---	.76

Table 2
Varimax Rotated Factor Matrix Showing Factor Loadings, Reliabilities, and Summary Statistics for the School Independence Measure Used with Non-Referred Classmates

Item Topics	Factor Loadings			
	I	II	III	Total Scale
Sporadic Events				
Substitute Teachers	.98	.15	.03	
Field Trips/Assemblies	.97	.16	.04	
Unexpected Events	.95	.15	.05	
Classroom Routines				
Group Activities	.26	.88	-.04	
Independent Work	.33	.78	-.10	
Classroom Didactics	.54	.74	-.13	
Transitions	.29	.73	.08	
School Routines				
Cafeteria	.14	.03	.98	
Recess	.16	.17	.91	
Travel to School	-.06	-.14	.80	
Rest Rooms	-.13	.22	.78	
Eigenvalues	5.86	1.96	1.31	
Percent of Variance	53.20	17.80	11.90	82.90
Alpha Coefficients	.98	.86	.46	.89
Mean Score	20.13	26.41	27.28	73.78
Standard Deviation	2.08	2.54	1.11	5.09
Total Scale and Factor Intercorrelations				
I	---	.68	.65	.92
II		---	.67	.89
III			---	.81

Appendix

School Independence Measure

S.I.M. ITEMS

TRAVEL: This item addresses traveling to and from school by the standard means of transportation that would be used by other students in the same grade living in the same neighborhood and attending the same school.

TRANSITIONS: This item addresses traveling from room to room within the school building as other students of the same grade are able to do.

GROUP ACTIVITIES: This item refers to participation in group activities which require peer interaction such as group projects or discussion groups appropriate for the student's grade level.

CLASSROOM DIDACTICS: This item addresses participation in teacher-directed large group instructional activities such as story time or formal lectures as other students of the same grade.

INDIVIDUAL WORK: This item addresses completing classroom assignments independently as other students in the same grade.

CAFETERIA: This item addresses eating meals at school at the same time and place as other students of the same grade.

RESTROOMS: This item concerns the use of restrooms while at school including toileting and hygiene, as appropriate for grade level. It does not include traveling to or from the restroom.

RECESS: This item concerns the appropriate use of free time to participate in social or recreational activities as other students of the same gender.

UNEXPECTED EVENTS: This item concerns coping with unanticipated events such as fire drills or schedule changes as other students of the same grade.

FIELD TRIPS AND ASSEMBLIES: This item addresses participation in activities that are not scheduled daily but are part of the regular school program for the student's grade. It does not include travel to and from the activity.

SUBSTITUTE TEACHERS: This item concerns coping with a short term substitute teacher as other sudents of the same grade.

S.I.M. Scoring

Respondents should consider the student's typical performance over the past month. Ratings should reflect the student's level of independent functioning in ten school situations relative to other typical students of the same grade.

7____Does very well always or almost always

6____Student uses an assistive device but otherwise does very well always or almost always

5____Extra prompts sometimes needed (either verbal or nonverbal)

4____Extra prompts often needed (either verbal or nonverbal)

3____Physical help or guidance sometimes needed (hands on assistance)

2____Physical help or guidance often needed (hands on assistance)

1____Student does not perform this activity (activity must be adapted)

Explain:_____

If scored below 6, describe types of prompts or physical guidance.

If scored below 6, describe what could be done to improve the student's independent functioning.